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Discussion Paper No. 30

A GENERALIZED APPROACH TO THE AUDIT OF  
EFFICIENCY BY THE OAG

BY

M. Attridge, A. LeQuang and M. Zelman

JUNE 1984

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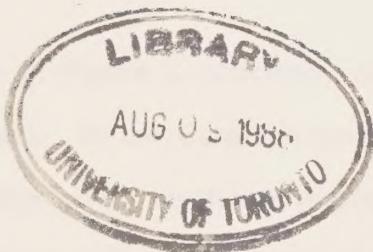
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## INTRODUCTION

Since the passing of the Auditor General Act the word "efficiency" has been used in many different ways and with many different meanings within the Office. This paper is an attempt to pull these different approaches together and develop a conceptual framework which can then be used in a consistent manner on any audit we carry out.

It is appreciated that in the literature today there are many terms which are used to express the same idea -- for example, the terms productive management, productivity and effectiveness. We do not propose to debate the merits of any particular term but rather to concentrate on the fundamental concept as referred to in section 7 of the Act and thus for the moment we shall stay with the word efficiency.

As shown in Figure I, efficiency can be defined in simple terms as output divided by input. In the Canadian government terminology, a "goal" has been defined as an objectively verifiable result, and this is divided by the sum of all the inputs. The inputs will normally include all the factors of production; that is, labour, capital, equipment, materiel, etc. This immediately makes it apparent that performance measurement of labour, while it may be a very important part of the assessment of efficiency, is not itself efficiency.

Considering this definition we can then discuss the audit domain for efficiency auditing (shown in Fig. II). It begins with the input or series of inputs, goes through the process of converting these inputs or factors of production, and



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finishes up with a product or a service which is the goal. The term "due regard" implies that the information to ensure that the process is being carried out satisfactorily becomes part of the audit domain. In this context it is particularly important to consider the adequacy of the cost accounting system.



### DEFINITION OF EFFICIENCY

$$\text{EFFICIENCY} = \frac{\text{OUTPUT}}{\text{INPUT}}$$

(PRODUCTIVE MANAGEMENT)

$$= \frac{\text{GOAL (OBJECTIVELY VERIFIABLE RESULT)}}{\sum \text{LABOUR} + \text{CAPITAL} + \text{EQUIPMENT} + \text{MATERIEL}}$$

Fig. I



### EFFICIENCY AUDIT DOMAIN

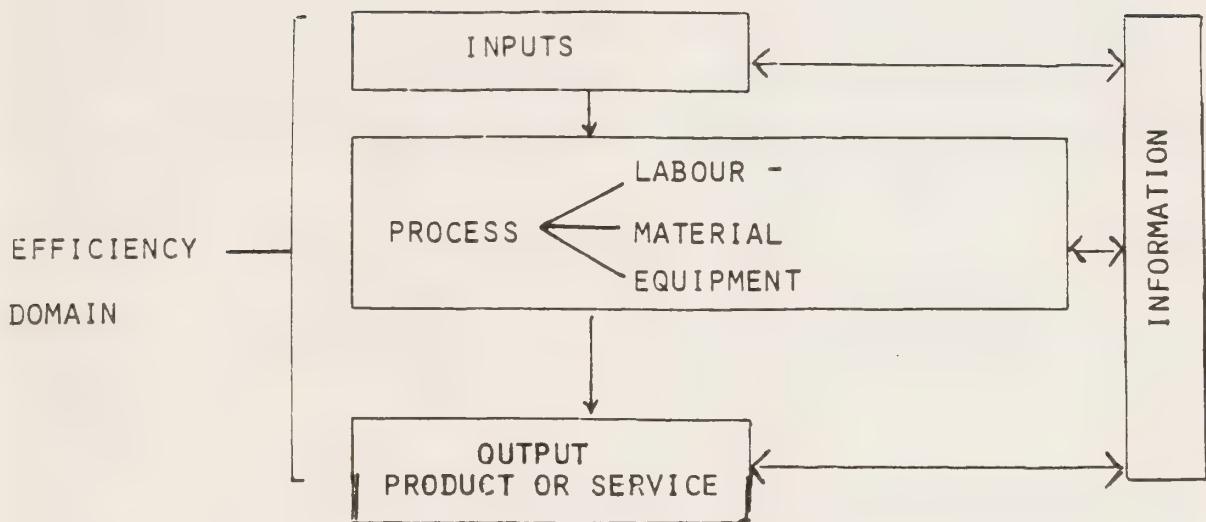


Fig. II



### The Audit Process

Figure III is the rough outline of the logic of the audit of efficiency. It will become immediately apparent that there are distinct similarities between the logic of the audit process and the logic that a manager must go through in deciding his production process. This of course is not surprising. The hierarchy of audit materiality, risk and sensitivity -- i.e., what matters and will have a significant impact -- should normally be similar to the matters managers consider important.

The specific stages of this process can now be discussed in more detail.

As a first cut we can break this rather complex diagram into four stages as shown in Figure IV:

- understanding the entity;
- product definition;
- method analysis; and
- work analysis.



# LOGIC DIAGRAM FOR THE AUDIT OF EFFICIENCY

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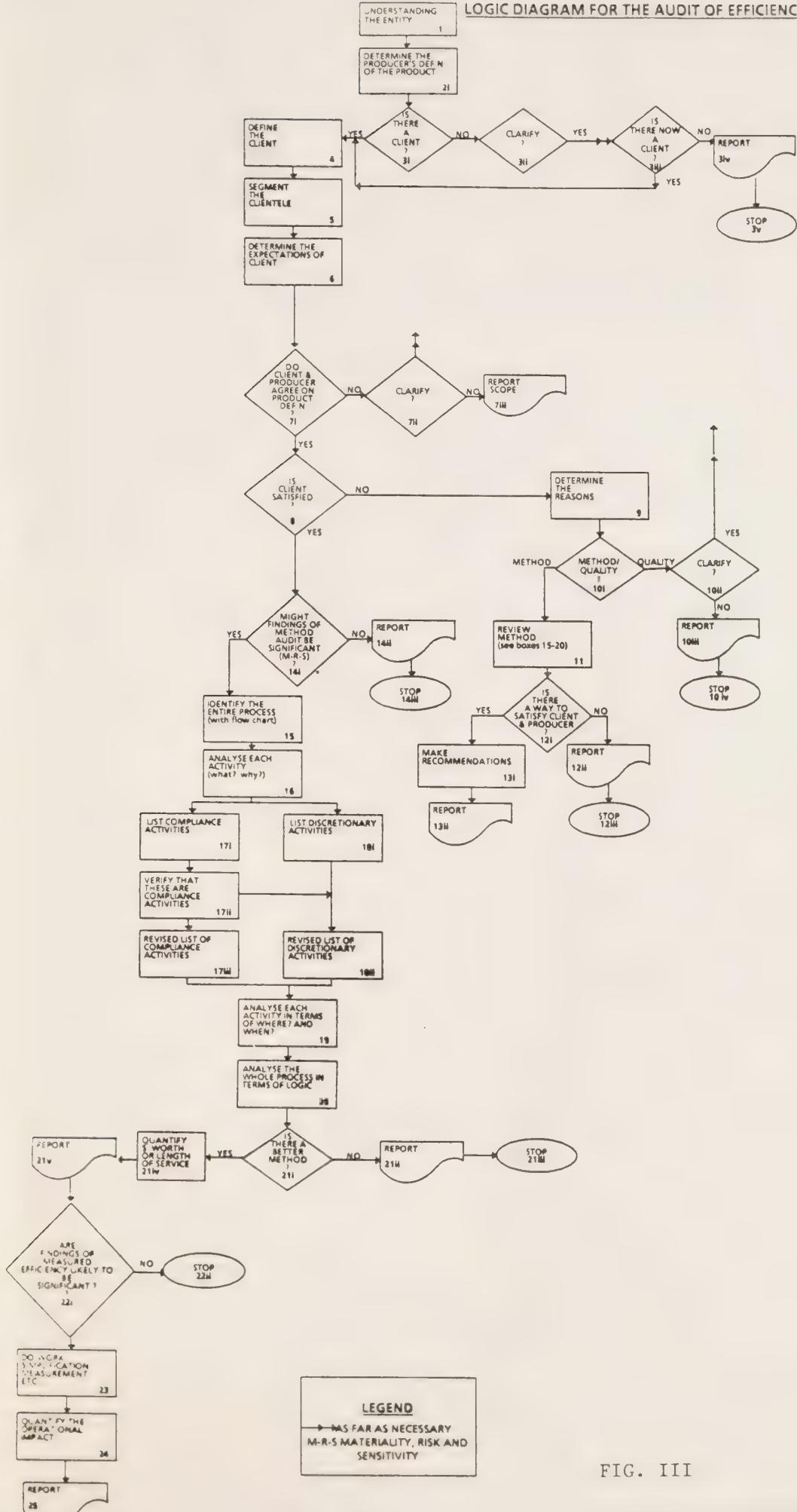


FIG. III

**LEGEND**

→ AS FAR AS NECESSARY  
M-R-S MATERIALITY, RISK AND  
SENSITIVITY



## LOGIC FOR THE AUDIT OF EFFICIENCY

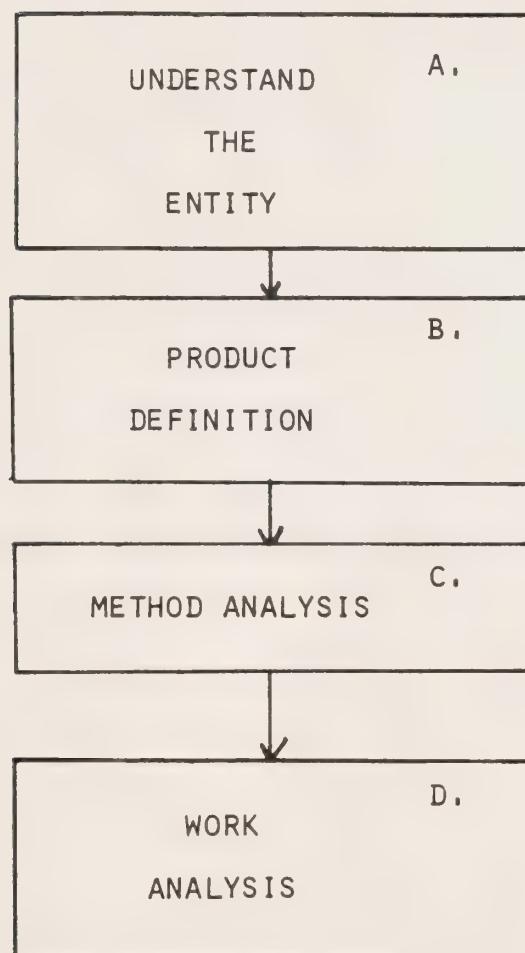


FIG. IV



### Understanding the Entity

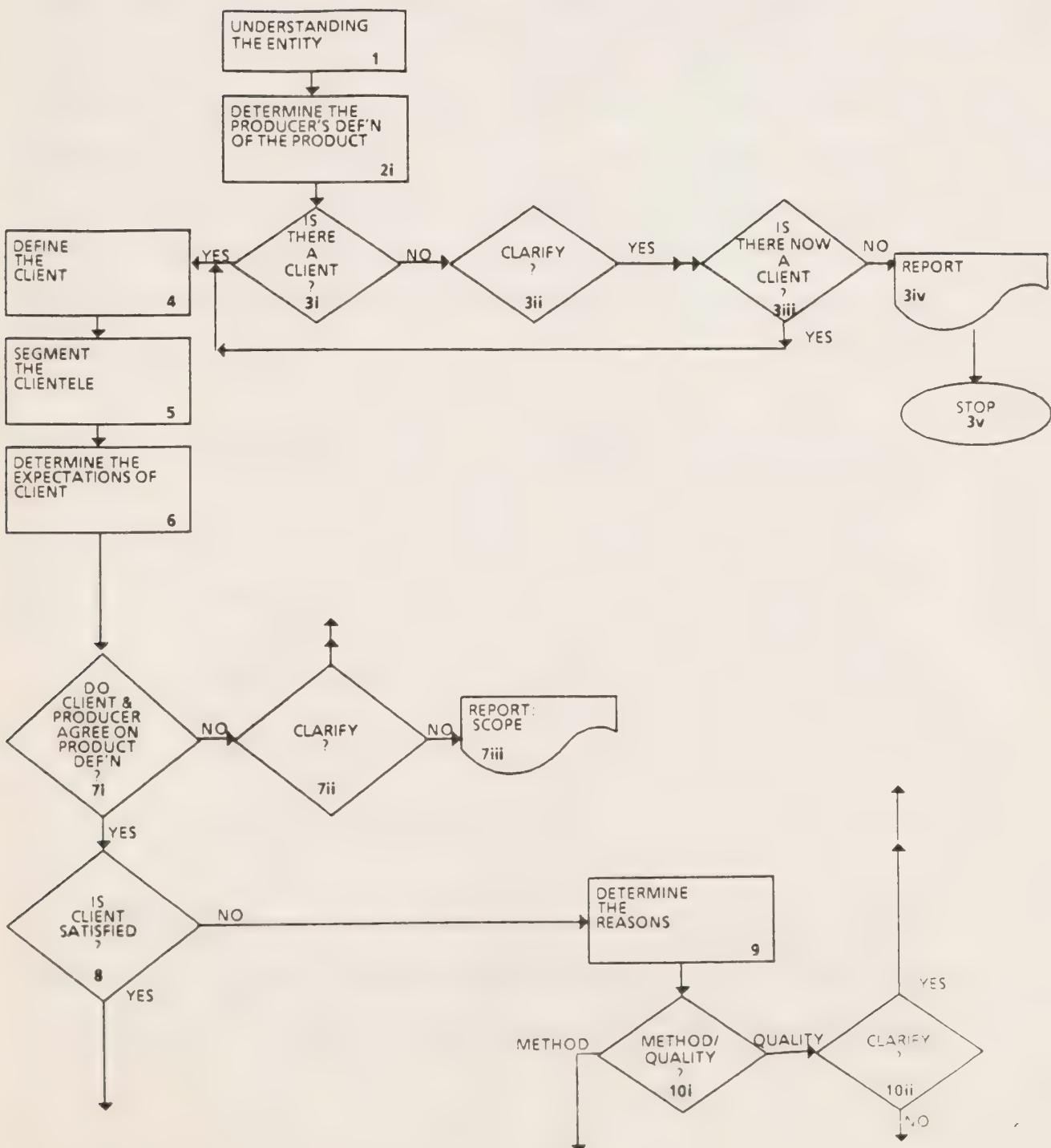
In the various courses about comprehensive auditing, as well as in our Audit Manual, there is extensive discussion regarding the importance of understanding the entity to be audited. A lot of emphasis is placed on understanding the environment in which the entity is operating, the clients for or beneficiaries of the goods and services provided, and the various constraints that may act upon the entity. All of this material applies in this concept of efficiency auditing.

There is however one fundamental difference. The emphasis in efficiency auditing is on the product or service rather than on the entity. Considering the earlier discussion of the definition of efficiency as being an output or outputs divided by the various inputs or factors of production, it must be borne in mind that sometimes different agencies are involved in delivering any specific product. As an example, various payments issued under the income security programs of the Department of National Health and Welfare may have the cheques issued through DSS. Similarly, the acquisition of materiel for a particular activity may have to be done through DSS.

Thus, in this context, understanding the entity may very well be the "entities", paying particular attention to the definition of the product and the identification of the clientele.



# PRODUCT DEFINITION





### Product Definition

In this paper the word "product" will be used for either a good or a service delivered to someone other than the producer. We will also use the word "client" for the beneficiary or recipient of the good or service provided by the producer. This specific definition of the word product implies that without a client there is no product, i.e., the producer has a hobby and is carrying out work largely for his own enjoyment. (It should be noted that some "knowledge products" are an apparent exception to this general rule. An internal consulting group may do work which will facilitate their own future work for clients. The logic of such cases may be perfectly valid but should be carefully examined if the issue is material.)

A product should normally be specified (i.e., rigorously defined) in terms of:

- required performance;
- acceptable tolerances;
- level of service;
- quality specifications; and so on.

For goods, there must be a physical description sufficiently precise that quality evaluation can be based on predetermined standards or norms. These are an essential basis for comparison to allow users to judge whether, and to what



extent, the product is "good" or "bad". For services there must be a clear description of the service itself as well as the level of service provided. (This is frequently stated in terms of a probability and time statement, e.g. a 90 per cent probability that somebody entering a manpower office will be served with less than 30 minutes waiting time. It may also include accessibility, coverage, etc.) These definitions then lead directly to the question "Is there a client?". The identity of a client could be determined by:

- (a) talking to the producer;
- (b) examining legislation and/or other pertinent documents;
- (c) logic; and so on.

It should be noted that the implicit client for a product or a service may be the authority that issues a statute or regulation which defines goods or services to be delivered.

If no client can be found for the service, this would cast doubt on the relevance of the entire range of activities leading up to the product. Thus it is essential that if no client is found, the matter be clarified. The absence of a client for an activity after thorough review would normally be an automatic reporting topic. If there is no client for the product then any further effort or expenditure on auditing efficiency of production is irrelevant.

If the client has been found, the auditor must define the nature of the client in some detail. It should be noted that there may very well be more than



one client for a product or service, and some products may service different clients with different components of the product.

As an example, both employers looking for staff and individuals looking for jobs are clients of the manpower offices who are trying to get the best possible fit between the needs of the employer and the skills of the potential employee.

Thus the clientele and the product may need to be segmented to clearly identify which product or part of the product is being delivered to which client. As an example:

- A Coastguard icebreaker breaks ice to allow commercial navigation; the client is the master or owner of a commercial vessel.
- An icebreaker breaks ice for flood control; the clients are people living in low lying areas affected by flooding.
- The Coastguard carries out search and rescue missions; the clients are anyone in difficulty on navigable waters.
- The Coastguard places navigation aids; the clients are the masters of a wide range of vessels from small pleasure craft to very large ocean carriers.

Since all these products may be delivered in one voyage, it is necessary to clearly differentiate products and clients and to identify the rules



which determine the priority of tasks for the captain of the icebreaker. Efficiency cannot be determined otherwise.

For each client it is then necessary to determine the client's expectations about the product since the client and the producer may not be in full agreement. Continuing with the previous example, an icebreaker captain may see his product as the breaking of ice to ensure that there is no hazard to navigation. The captain of the client vessel may see the product as opening up a channel to allow him to proceed at a more economical speed. The amount of clearing in the channel will be quite different under these two definitions of the product. If the product definitions by the producer and the client are fundamentally different, the auditor may have to go back to source documents to determine the nature of the product or the relative emphasis on the different concerns of the producer and the client.

In an extreme case there may be a requirement for a scope limitation on the audit if it is impossible to resolve these differences.

It should be noted that in some cases the producer may have the authority to override the client's wishes or the converse. If this is so, the audit should proceed as if there were full agreement. As an example, Treasury Board has directed the Department of Public Works not to provide space in excess of Treasury Board standards, no matter what the client wants, unless this is specifically authorized by Treasury Board. Thus, the client department may be quite dissatisfied with the product provided but the producer is operating within legal direction regarding the nature of the product.



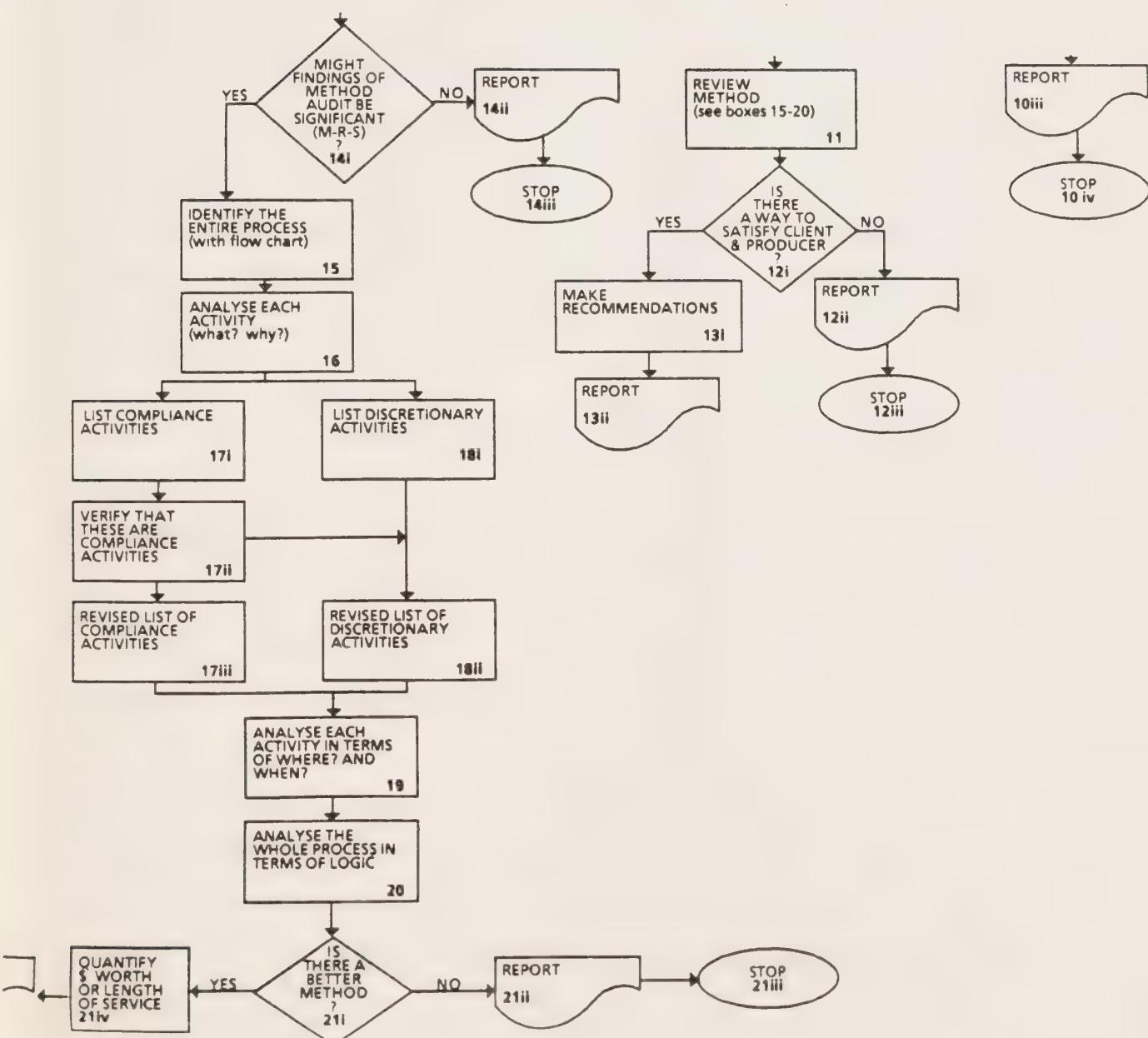
Although the client and the producer may agree on the product definition, the client may still not be satisfied with either the quality of the product or the level of service. If the difference of opinion is significant, the auditor should trace this back and determine both the nature of the difference of opinion and its significance on the client's operations. This tracing back may have to go all the way to the original product definition to find a resolution.

There may also be dissatisfaction on the part of the client with the method of delivering the product. As an example, there may be differences of opinion whether funds should be transferred by cheque or electronically. The problem between the producer and the client may lie partially with the quality of the product and partially with the method.

In either case, the auditor will normally determine whether the producing organization has a process in place to monitor client satisfaction and to deal with any related problems. If there is such a process the auditor will normally verify that it is adequate and reliable, possibly by doing some substantive testing. If it is satisfactory the auditor can then rely on it. If there is no process to assess client satisfaction, the auditor will have to determine this himself.



# METHOD ANALYSIS





### Methods Analysis

Before beginning any work in the area of methods analysis, the auditor must determine whether the subject is likely to be significant. The normal parameters assessed are materiality, risk and sensitivity. Materiality usually deals with the dollar value, risk is the probability of there being something wrong or less than adequate, and sensitivity deals with the impact of a problem if one exists. In this context it must be remembered that the dollar figure to be used in materiality must be modified by the aspect of sensitivity, i.e., while a production process may cost \$100 million a year, there may be no potential improvement that we can even think of in the overview. In this case we would not bother doing the method analysis as part of the audit.

Some of the tests of likelihood for improvement might be an examination of ratios from similar operations or other jurisdictions. As examples we might consider the number of pieces of luggage per luggage handler at an airport in Canada compared to those in other countries, the daily operating cost of a Coastguard icebreaker compared to one owned by an oil company, the ratio of operating to supervisory staff in a given type of activity, etc.

It must be emphasized that the finding and selection of suitable ratios and their proper utilization is a specific skill which cannot be used casually on the basis that the numbers look about right. In fact, the auditor must have some understanding of the nature of the particular activity he proposes to audit and its environment.



If the decision is to proceed, the first stage is to identify the entire process. This will normally involve developing some kind of flow chart or other graphic material clearly illustrating the specific individual activities forming part of the process, their relationship in both space and time, the recording of time taken in each individual activity, and the tracking down of the inputs to each activity. The information for these charts will normally come from observation, interviews and documentation.

Each individual activity must then be precisely described to determine what is being done. The affected personnel, i.e., operators and/or managers, should be interviewed to determine why it is being done. The answers will normally take the following form:

- to transform this intermediate product into that final product;
- to move this item from there to there;
- to satisfy Treasury Board regulations;
- this is government policy; etc.

It is important at this stage to clearly identify the activities that lie within managerial discretion as opposed to those that are stated to be specifically a requirement of statute law or regulations.

Because of the very expensive mythology about the requirements of Treasury Board, the Public Service Commission, the Public Service Staff Relations Board, etc. it is necessary for the auditor to verify that activities identified



as being required for compliance are indeed so. Thus the auditor will have to check the specific citations from regulations or other authorities to determine that the activity is indeed required in accordance with authority and, secondly, to determine the limitations on the manager's discretion regarding how to comply. By the end of this stage the auditor will essentially have clearly identified the limits to managerial authority which might constrain the manager in achieving efficiency in this operation.

The entire process can then be assessed, activity by activity, from the point of view of where and when. The where normally refers to the physical location of the activity and the when refers both to absolute time -- i.e., an activity might have to take place at 9 a.m. -- or it may refer to the logic that the activity must take place after "X" and before "Y". In each case the auditor will have to examine the "why" of the question, i.e. why is it being done in this particular place or why does it have to be done at this particular time or in this particular logical sequence. It should be remembered that for compliance activities, the where and when may have been determined by the given authority, and this should be verified.

The auditor can now analyse the whole process in terms of logic and determine whether or not there might be a better method of carrying out the process. In this context it must be borne in mind that there is no such thing in absolute terms as a "good" or "bad" method. There are only better or worse. The test of better or worse might be:

- Can the same product be produced at a lower cost?



- For essentially the same cost can more, or a higher quality, or a better level of service be produced?

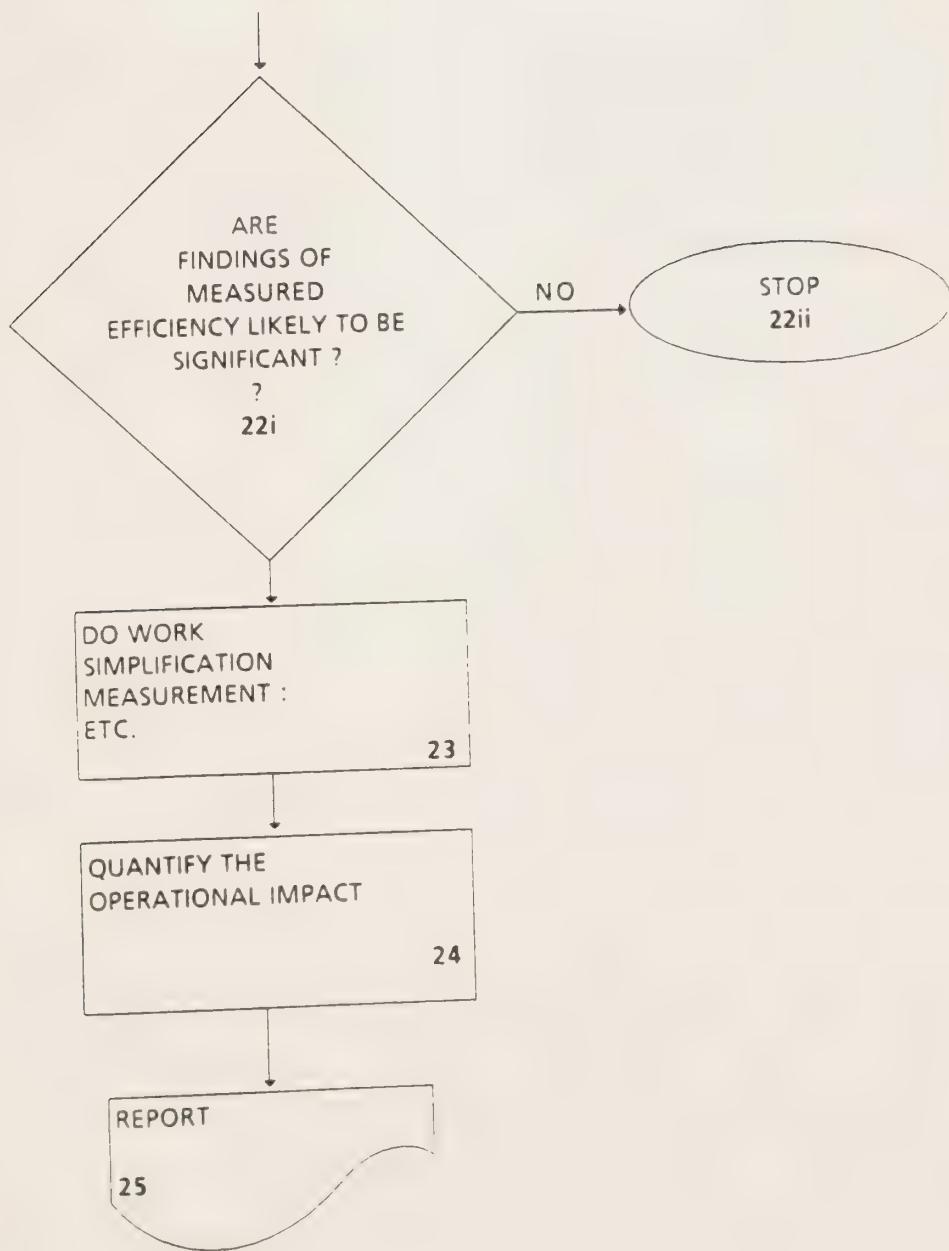
Thus if the auditor wishes to define a better method it must be quantified by either:

- (a) determining the cost of producing the same output by a different method and showing the possible saving; or
- (b) determining the improved level of service or of higher quality using a different method without raising the cost.

In determining costs and benefits it must be borne in mind that costs occur at different times, e.g. capital costs and operation and maintenance costs. Thus specific analysis, whether it is of benefit/cost, cost effectiveness or other factors, may require discounting to obtain proper quantification. The auditor must also bear in mind any resource limitations because of capital rationing, the possibility of obtaining staff, practical problems in reassignment and relocation, etc.



# WORK ANALYSIS





### Work Analysis

Having determined the optimum general method of production we can now determine the efficiency of any single factor of production or sub task such as use of capital assets, use of labour, etc.

Before starting the detailed study, however, the auditor must once again determine whether the investment of resources in this stage of the audit is justified from the point of view of materiality, risk and sensitivity. Thus, for example, a three person operation handling an administrative function but apparently operating at approximately 60 per cent efficiency is probably not sufficiently important to justify a detailed work study if all the preceding parts of the process, such as quality of product and determination of method, are satisfactory. For this stage it is particularly important to determine the driving factor of production. If the process at this stage is machine driven -- that is, the output is limited by the utilization of the machine -- it may be emminently reasonable to have extra maintenance staff available to ensure that the machine keeps operating, even if we were to find that they were occupied 25 per cent or less of their total time. Each case must be judged very carefully on its merits.

If the area is significant from the point of view of materiality, risk and sensitivity, there are a great number of techniques available, including time and motion study, engineered work standards, ergonomics, etc. Just as in method study, it must be remembered that there are no absolutes in efficiency; i.e., there is no given number that indicates efficiency or inefficiency. Efficiency is relative. Thus, we cannot comment on the inefficiency of an operation unless we



can clearly demonstrate in logic, and quantify, that there is a better way, i.e., a more efficient way of carrying out the task within the externally imposed constraints. This quantification can be in terms of more product, a better product, better response time, etc. per unit of cost, or lower costs per unit of output.



## Summary

The approach to efficiency described thus far is based on a number of fundamental assumptions:

1. Efficiency equals output divided by input.
2. Efficiency is relative; i.e., to make an audit comment about lack of efficiency is meaningless unless we can demonstrate a more efficient way of doing things.
3. A product requires a client. If the client cannot be identified then what we may see is a hobby.
4. This approach lends itself to either a good or thing, or a service.
5. The approach can be used on a small sub-organization, such as the accommodation services inside the administration branch of a department, or an entire departmental program, such as Navigation Aids for the Coastguards.
6. The same logic of approach can be used whether we are dealing with the inventory level in a DSS warehouse, including economic order quantities, level of service, etc. or the messenger system to distribute our own mail.



7. The process is product driven not entity driven, i.e., more than one entity may be involved in the delivery of any good or service and must be considered in assessing methods.
  
8. The auditor must be sensitive to the nature of the particular product being audited.

It is hoped that this paper will be expanded by a series of "case law" annexes which will be produced from time to time in response to specific operational questions or problems as they occur in specific audits.



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